A Watershed Conditions Report For the State of Kansas

HUC 11030010 (Gar-Peace) Watershed

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Watershed Conditions Report
For
HUC 8 11030010 (Gar-Peace)

Prepared by
Kansas Department of Health and Environment (KDHE)
Nonpoint Source Section
4/4/01

EXECUTIVE SUMMARY

This Watershed Conditions Report is designed to serve as a water quality "atlas", and is intended to provide stakeholders in water quality with a tool to assess the condition of water resources within their watershed. Surface water quality for HUC 8 11030010 streams and rivers is generally fair to poor condition with many of the surface water bodies not supporting their designated uses. The primary pollutant concerns for streams and rivers within this watershed are sulfate, chloride, chlordane, pH, and fecal coliform bacteria (FCB). Chloride is an inorganic mineral found in Kansas lakes, streams and groundwater. In high concentrations, chloride may cause adverse water taste, deterioration of plumbing, and hypertension in humans. Sulfate is a naturally occurring mineral that can cause taste and odor problems in drinking water. Chlordane is a pesticide that was historically used for termite control. It has been banned for several years. pH determines the alkalinity or acidity of water in the lake. If the water is too basic or acidic it can potentially stress or kill the aquatic life and vegetation. Fecal coliform bacteria (FCB) is present in human and animal waste and serves as an indicator of potential disease causing organisms.

Within huc 11030010 there are several small lakes and private ponds. Currently, there are no larger lakes identified by the Kansas Surface Water Register. There is one monitoring site in the northern portion of the watershed on Carey Park Lake. Based on monitoring data collected from this lake, no TMDL is required.

Groundwater resources in HUC 8 11030010 include alluvial aquifers of the Arkansas River and it's tributaries, the High Plains aquifer and portions of the Dakota aquifer. Water from these aquifers is generally in good condition with naturally occurring minerals and nitrate as the primary pollutant concerns.

PURPOSE

The Watershed Conditions Report is designed to serve as a water quality "atlas" for a given watershed, and is intended to provide Watershed Stakeholders Committees (WSC) with a tool to assess the condition of water resources within their watershed.

BACKGROUND

The Clean Water Act mandates that States assess the quality of their waters and implement Total Maximum Daily Loads (TMDLs) for water bodies that do not meet their designated uses. The following is a summary of steps taken by the State of Kansas to comply with these requirements of the Clean Water Act.

The Kansas Department of Health and Environment (KDHE) prepared the Kansas Unified Watershed Assessment in 1998. This assessment classifies the State's watersheds into four categories. A Category I classification means the watershed is in need of restoration due to having water quality impairments or degradation of other natural resources related to an aquatic habitat, ecosystem health and other factors related to aquatic life resources. Category II watersheds are in need of protection. Category III are watersheds with pristine or sensitive aquatic system conditions on lands administered by federal, state, or tribal governments. Category IV watersheds are those for which there is insufficient data to make accurate classification. KDHE has assigned a restoration priority score to each Category I watershed.

As mandated by section 303(d) of the Clean Water Act, lakes and streams within the Category I watersheds, which do not meet water quality standards, are published biannually in the 303(d) list. Subsequently, lakes and streams which appear on the 303 (d) list are scheduled to have a Total Maximum Daily Load (TMDL) prepared. KDHE is currently preparing TMDLs for impaired stream segments located within the highest restoration priority watersheds.

To restore water quality within the Category I watersheds, KDHE recommends the implementation of a Watershed Restoration and Protection Strategy (WRAPS). The ultimate goal of the WRAPS process is to create and implement a plan to restore the health of water bodies that do not meet their water quality standards. Additionally, the WRAPS process will insure that water bodies that currently meet their water quality standards are protected.

KDHE recommends that the WRAPS process be implemented on a local level by a Watershed Stakeholders Committee (WSC). The WSC would have the responsibility of working with local and state agencies to develop a WRAPS plan. This plan should identify the following: public outreach methods; required monitoring activities based on water quality goals and outcomes; specific water quality problems; watershed coordinator/evaluator; actions to be taken to achieve water quality goals and outcomes; schedule for implementation of needed restoration measures; and funding needs.

Streams and Rivers

HUC 8 11030010

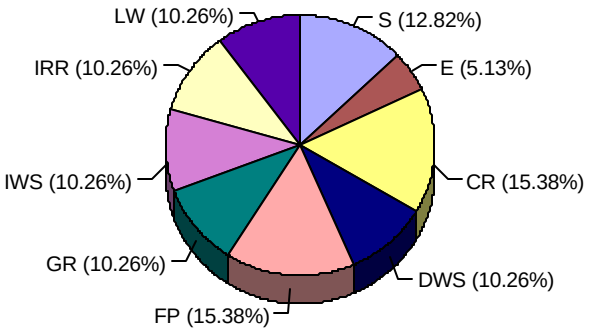
The Huc 8 11030010 watershed is ranked nineteenth in priority for watershed restoration throughout the state. According to the Unified Watershed Assessment, approximately 56% of the stream miles within this watershed are impaired. The Arkansas River, Gar Creek, Peace Creek and Salt Creek are among the larger streams and creeks within this watershed. See Attachment 1 for a map of streams and rivers in HUC 8 11030010.

Designated Uses

There are 75 public water supplies within the watershed, many of which draw water from the Arkansas river and local streams. According to the Kansas Surface Water Register, the most common designated uses for streams and rivers in this watershed include: aquatic life use, food procurement, contact recreation, domestic water supply, industrial water supply, irrigation use, livestock, and groundwater recharge.

Figure 1

Surface Water Uses



- S=Special Aquatic Life Use Water
- E=Expected Aquatic Life Use Water
- FP=Food Procurement
- DWS=Designated for domestic water supply use.
- GR=Designated for ground water recharge.
- LW=Designated for livestock watering use.
- IWS=Designated for industrial water supply use.
- IRR=Designated for irrigation use.
- CR=Designated for contact recreation

TMDL/Contaminate Concerns

Streams and rivers throughout Kansas have been sub-divided into segments. By dividing the streams and rivers into segments they can be better analyzed and understood. A reach of river or stream may have segments which vary greatly in water quality, based on surrounding land uses.

Surface waters not meeting their designated uses will require total maximum daily loads (TMDLs). Approximately 50% of stream segments within this watershed require TMDLs. These are segments of the Arkansas River and Peace Creek. The primary pollutant concerns regarding the segment of the Arkansas River are chlordane, chloride, sulfate, and pH. The primary pollutant concerns regarding the segment of Peace Creek are chloride, fecal coliform bacteria (FCB), and pH. Chloride is an inorganic mineral found in Kansas lakes, streams and groundwater. In high concentrations, chloride may cause adverse water taste, deterioration of plumbing, and hypertension in humans. Sulfate is a naturally occurring mineral that can cause taste and odor problems in drinking water. Chlordane is a pesticide

historically used for termite control. It has been banned for several years but due to it's long life span is still found in surface water today. Fecal Coliform Bacteria (FCB) is present in human and animal waste and serves as an indicator of potential disease causing organisms. pH determines the alkalinity or acidity of water in the lake. If the water is too basic or acidic it can potentially stress or kill the aquatic life and vegetation.

Potential Pollution Sources

Potential sources of sulfate are underlying parent material within the watershed containing sulfate that becomes dissolved into the water table. Underlying parent material may also be the source of unusual high amounts of chloride in surface water within this watershed. Additionally, low flow rates of surface water and irrigation use add to the problem. Potential sources of chlordane would be historical domestic use. Potential sources of FCB include feedlots, septic systems, wildlife, wastewater treatment facilities, and grazingland.

Analyzing the land uses within this watershed helps to understand which land uses might have greater influences on the source of the impairments. Below are a list of the land uses in this watershed which can effect a stream or river segment. Grassland is considered grazingland for livestock.

- Urban Area...2%
- Row Crop....23%
- Grassland....73%
- Wooded area.... 1%
- Water area.... .6%

Based on the watershed's land use percentages, the primary pollutant sources for FCB could be feedlots and grazingland. Additionally, municipal waste water treatment plants, septic systems and urban/suburban runoff may contribute significant amounts of FCB into the watershed.

Feedlots: In Kansas, confined animal feeding operations (CAFOs) with greater than 300 animal units must register with KDHE. There are approximately 85 registered CAFOs located within HUC 8 11030010 (this number, which is based on best available information, may be dated and subject to change). Waste disposal practices and waste water effluent quality are closely monitored by KDHE for these registered CAFOs to determine the need for runoff control practices or structure. Because of this monitoring, registered CAFOs are not considered a significant threat to water resources within the watershed. A portion of the State's livestock population exists on small unregistered farms. These small unregistered livestock operations may contribute a significant source of fecal coliform bacteria and nutrients, depending on the presence and condition of waste management systems and proximity to water resources.

Wastewater Treatment Facilities: There are approximately 6 municipal and industrial wastewater treatment facilities within the watershed (this number may be dated and subject to change). These facilities are currently regulated by KDHE under National Pollutant Discharge Elimination System (NPDES) permits. These permits specify the maximum amount of pollutants allowed to be discharged to the "waters of the State". Due to the chlorination processes involved in municipal waste treatment, these facilities are not considered to be a significant source of fecal coliform bacteria; however they may be a significant source of nutrients.

Septic Systems: There are currently thousands of septic systems within the watershed and this number is increasing. When properly designed, installed, and maintained, septic systems can act as an effective means of wastewater treatment. However, poorly maintained or "failing" septic systems can leach pollutants into nearby surface waters and groundwater. The exact number of failing septic systems within the watershed is unknown; however the number may be increasing due to the current trends in suburban development. Local Environmental Protection Programs and County health departments may provide excellent sources of information regarding the proper design, installation, and maintenance for septic systems.

Wildlife: Wildlife located throughout the watershed are not usually considered a significant source of nonpoint source pollutants. However, during seasonal migrations, concentrations of waterfowl can add significant amounts of fecal coliform bacteria and nutrients into surface water resources.

Row Crop Agriculture: As stated above, approximately 23% of the watershed's land is used for row crop agriculture. Row crop agriculture can be a significant source of nonpoint source pollution. Common pollutants from row crop agriculture include sediment, nutrients, pesticides, and fecal coliform bacteria. Many producers within the watershed regularly implement and maintain BMPs to limit the amount of nonpoint source pollutants leaving their farm. Some common BMPs include: the use of contour plowing; use of cover crops; maintaining buffer strips along field edges; and proper timing of fertilizer application.

Urban/Suburban Runoff: Many urban landscapes are covered by paved surfaces including roads, driveways, parking lots, and sidewalks. These surfaces are impermeable and tend to divert water into storm drains at high velocities. This increased flow velocity from urban areas can cause severe stream bank erosion in receiving water bodies. Additionally, urban and suburban runoff may carry other pollutants like petroleum hydrocarbons and heavy metals. Currently, the watershed is only about 2% urban. Limiting paved surfaces is the key to slowing urban nonpoint source pollution. The use of grass swales, open spaces, and storm water retention ponds are recommended to slow runoff in urban areas.

Lakes & Wetlands

Huc 8 11030010 has a few small lakes and private ponds. Due to the limited amount of surface water within this watershed there is currently only one lake monitoring site. No TMDLs for lakes are required at this time. The existing lakes within the watershed are included in the Streams and Rivers map in Attachment 1.

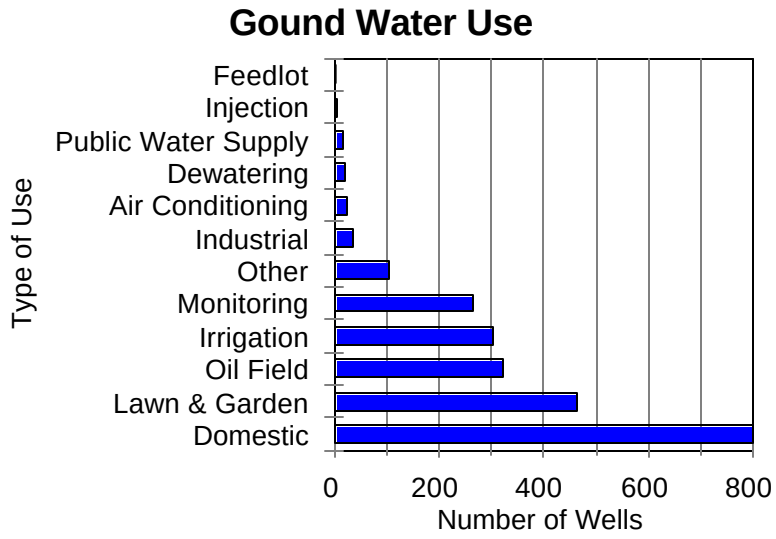
Groundwater

Major groundwater aquifers underlying this watershed include the High Plains aquifer, portions of the Dakota aquifer, and alluvial aquifers of the Arkansas River and it's tributaries. See attachment 4 for a map of groundwater aquifers within this watershed.

Designated Uses

There are approximately 2,353 groundwater wells located within the watershed. Water from these wells is used for domestic use, lawn and garden, oil field supply, irrigation, monitoring wells, industrial supply, air conditioning, dewatering, public water supply, injection, and feedlots.

Figure 3



Aquifer Characteristics

High Plains Aquifer: The High Plains aquifer underlies this watershed. Water from this aquifer is often used for irrigation. This water is typically hard to very hard but in good condition with no dominating pollutants.

Alluvial Aquifer: Alluvial aquifers of the Arkansas River exist throughout the watershed. Alluvial aquifers provide the primary surface water source for the few public water supplies located within the watershed. Water quality in alluvial aquifers is generally good; however nitrates, minerals, pesticides, and bacteria can be pollutant concerns.

Dakota Aquifer: Portions of the Dakota aquifer exist in the western tip of the watershed. Water from this aquifer is used for irrigation, public use, and rural-domestic water supply. Water from this aquifer is good; however chloride and sodium content increase with depth.

Potential Pollution Types and Sources

Common groundwater pollutants include: nitrates, chloride, sulfates, bacteria and atrazine. Nitrate impaired groundwater is perhaps the most prevalent groundwater contamination problem in the State.

Nitrate: Nitrate is a naturally occurring compound and is an essential component of all living matter. However, high concentrations of nitrate in drinking water can cause adverse health effects including "blue baby" syndrome. Sources of nitrate include municipal waste water treatment plant discharges, runoff from livestock operations, leaching of fertilizer from urban and agricultural areas, and failing septic systems.

Chloride: Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. The primary source of chloride impacted groundwater is intrusion of salt water from deeper formations, often due to improperly constructed water wells which allow confined aquifers to come into contact with each other.

Sulfates: Sulfate is a naturally occurring mineral that can cause taste and odor problems in drinking water. Sulfates are dissolved into groundwater as the water moves through various sulfur containing rock formations.

Bacteria: Fecal coliform bacteria are found in the digestive systems of warm blooded animals. In the environment coliform bacteria is an indicator of potential disease causing organisms. Potential sources of bacteria contamination in groundwater include livestock facilities, septic systems, pets, and wildlife. Many wells are impacted by bacteria due to improper construction which allows water from the surface to funnel directly into the well.

Ammonia: Ammonia is a chemical which is toxic to fish and aquatic organisms. Sources of ammonia are livestock, septic tanks, fertilizer, municipal and industrial waste.

TSS: TSS stands for Total Suspended Solids which are particles such as soil, algae, and finely divided plant material suspended in water. Sources of TSS are soil erosion from cropland, stream banks, or construction sites, and municipal and industrial waste.

VOCs: Volatile Organic Compounds, also called purgeable organics, are components of fuels and solvents. They are ingredients in many household and industrial products. Sources of VOCs are leaking fuel storage tanks, trash dumps, and some agricultural pesticides.

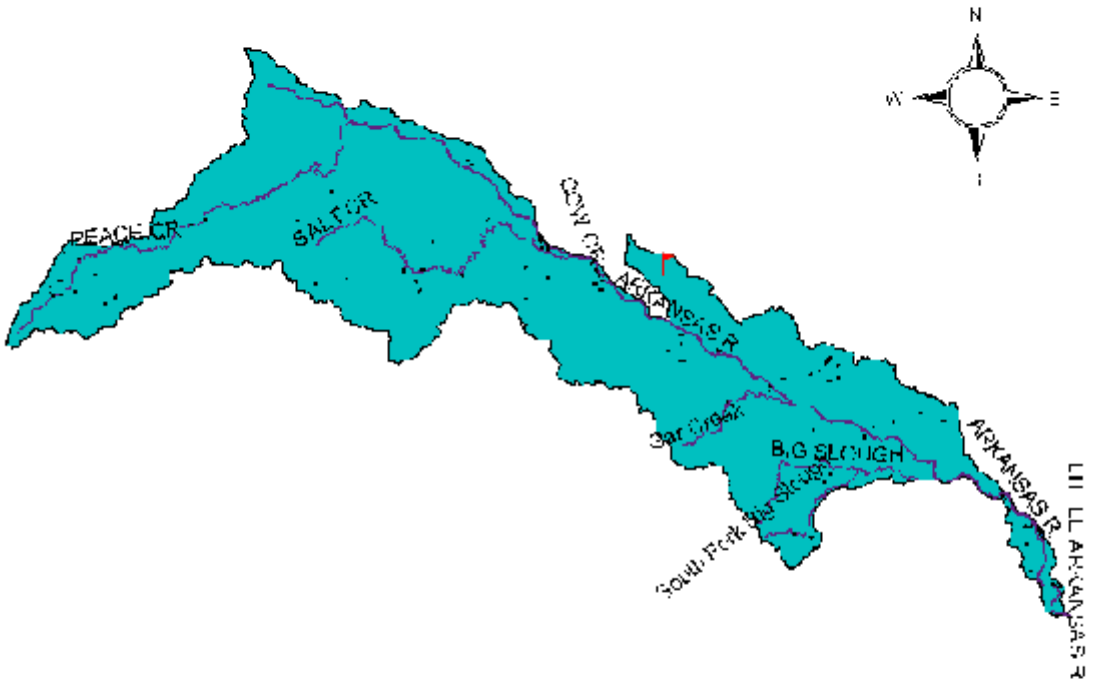
Iron: Iron is a naturally occurring element found in the soil throughout Kansas. It is an annoyance as it has an objectionable taste, causes a red stain to porcelain fixtures and laundry, and causes plumbing irritations.

Manganese: Manganese is a naturally occurring element and causes an unpleasant taste in drinking water, stains porcelain and laundry, and collects deposits in plumbing. It is naturally occurring throughout the soils in the state.

Attachment 1

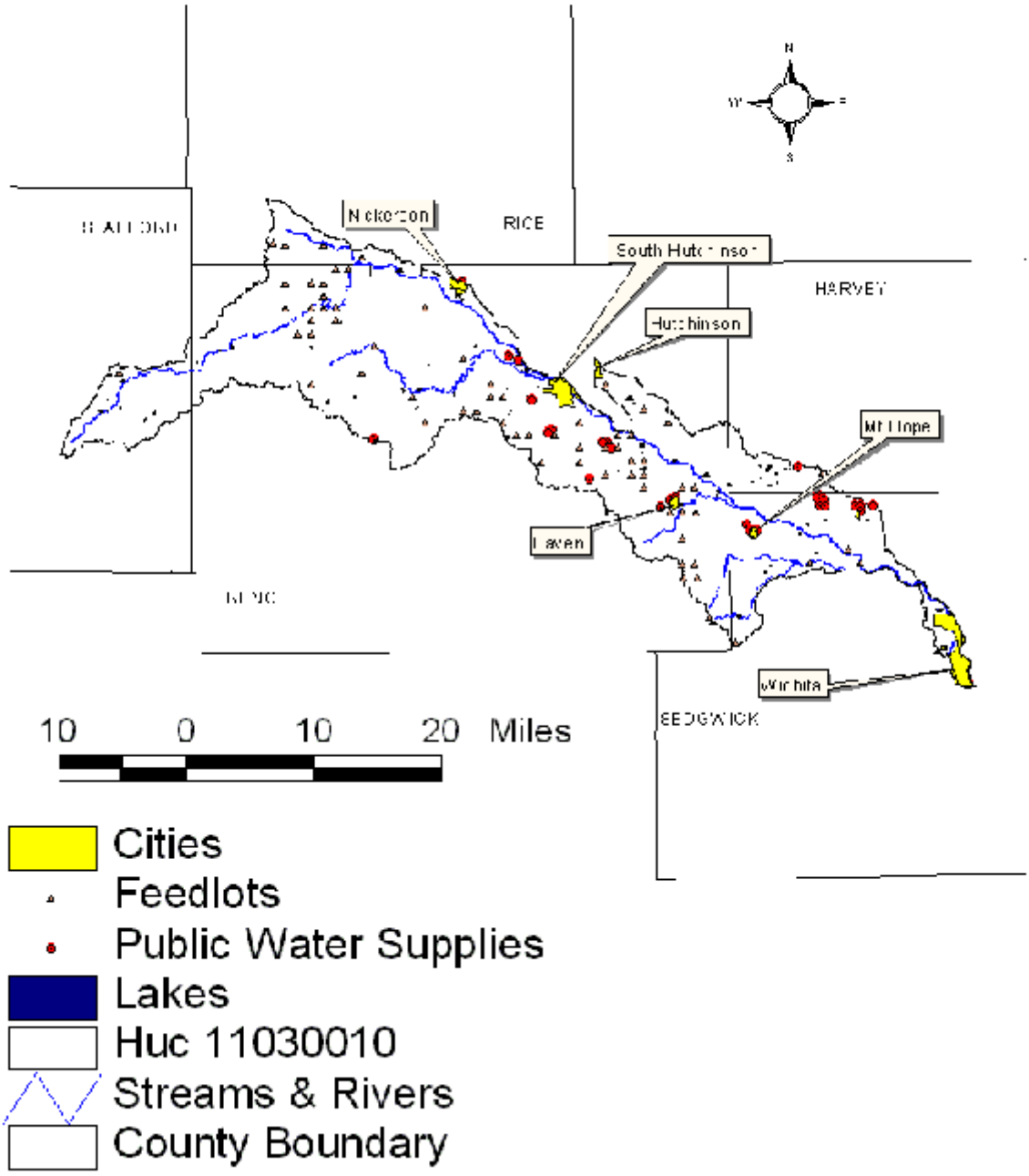
Maps

Huc -11030010- Gar-Peace Streams & Rivers

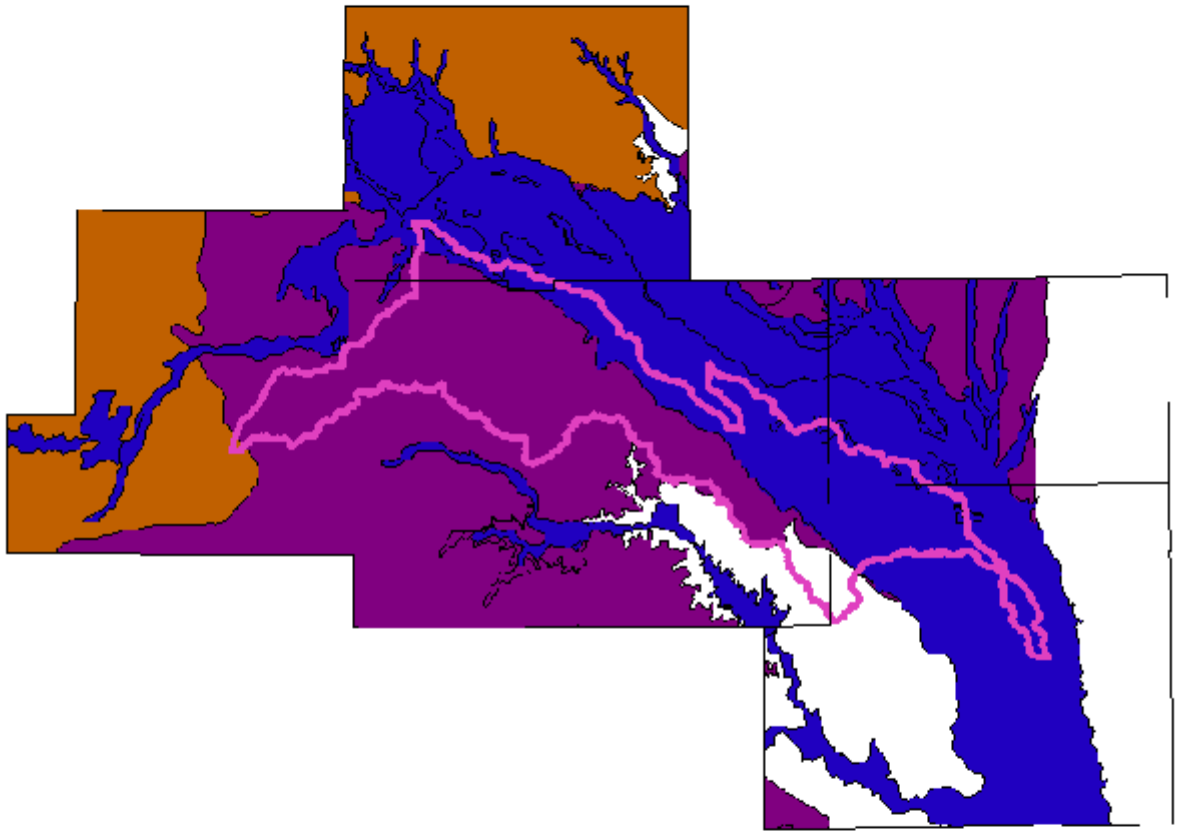


Lake Monitoring Sites
Lakes
Streams & Rivers
Huc 11030010

Huc -11030010- Gar-Peace Wateshed Boundary



Huc 8 11030010 Gar-Peace Groundwater Aquifers



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County Boundary
Watershed Boundary
Alluvial Aquifer
Dakota Aquifer
High Plains Aquifer

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Bureau of Water
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